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January 2009

CIRRELT-2009-02

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Customer-Centric Systems for the Airline Industry

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Abstract. Poor information diminishes customers' perception of service quality. This paper focuses on a novel systems intensive proactive approach to service quality in the context of the airline industry. This paper first sketches the information cycle from the customer's standpoint. Secondly it shows where information could be pushed to the customers. Finally, it discusses practical applications and the strategic implications for firms. While being informed will not eliminate customer dissatisfaction, a proactive approach to service quality will nonetheless prevent further satisfaction decreases and allow for a smoother journey and better time allocation.

Keywords. Customer-centric system, passenger information system, proactive service recovery, service quality, airline industry.

Acknowledgements. This research was in part funded by the Research Start-up Fund at Université Laval and by HEC Montréal. The authors would like to thank the participants at POMS 2008 for their comments on an early and substantially different version of this paper. The usual caveats apply.

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1. Introduction

As passengers come out of the airplane, they are slowly making their way through the maze of the airport. Meanwhile their luggage is unloaded from the aircraft. Finally arriving at the luggage pick up area, passengers stare anxiously at the conveyor belt carrying the luggage. At this point the common traveller just hopes he will see his luggage. The unlucky passengers will see, after thirty minutes of wait, a small cone saying that no more luggage were onboard that aircraft. It has been confirmed, their worst nightmare in this long journey comes to fruition: most of their belongings did not follow them to destination. Then begins the frustration of not getting proper service: they go to the clerk and he might already know that their luggage did not make it. In the best case the attendant already know when it will reach the customer, in the worst case: they just begin tracing it.

Another very common annoyance for travellers is to rush to the airport only to find that their flight is delayed, or even cancelled. The most prudent traveller will check the status of their flight online or via automatic phone services before leaving for the airport. The questions that arise are: Why is the onus on him to verify that the airline is keeping its engagement to provide the service he bought? Why did the customer have to wait thirty minutes at the conveyor belt? Isn't there a better solution to this? Why can't we provide a proactive customer relationship management approach (PCRM)? Travellers have come used to the idea of bearing the responsibility of getting the timely information required, but in these days of cut throat competition, a proactive approach would certainly give a competitive edge to a company for a small marginal cost increase.

1.1 Context

Airlines have been facing increasing competitive pressures since the 1990s [see 1] not only globally, but also in the United States. This could be attributed to an increasing level of

concentration in the airline industry [2]. These industry dynamics have typically led to two (sometimes simultaneous) classical responses: expansion in order to reap economies of scale and generate more revenue; and aggressive cost cutting. On one hand, expansion efforts yielded mixed results, especially in Europe, where acquisition strategies did not translate into the expected benefits [see 3]. On the other hand, aggressive cost cutting efforts led to a strategic convergence over time between low-cost carriers and traditional full service airlines [4]. The net effect of these two responses has been an overall increase in operational efficiency for the entire industry. This may be a mixed blessing as airlines experience service disruptions on a regular basis mostly because of unexpected events [5]. Unfortunately, higher levels of operational efficiency may not warrant the necessary slack in financial resources that is required to mitigate important shocks in the environment [see 6].

In theory, efficient competition yields lower prices and/or higher levels of service as firms try to outdo one another to consolidate and increase their customer base. Yet, in recent years, the quality of service provided by airlines has decreased in the United States [7], a trend that predates the tragic events of 9-11 [e.g. 8]. Tools like overbooking do yield substantial benefits [9], but are often a source of irritation for customers who, for example, find themselves arbitrarily bumped to other flights. These, and similar events, are causing important disruptions in the "satisfaction-profit chain" [10].

1.2 Striving for Efficiency

Nonetheless, airlines that are not adapting to a new and very dynamic environment are not positioned to effectively differentiate themselves [11], thus Franke [12] suggests that mere cost cutting is not sufficient and that more aggressive use of technology-related innovations may help build a strategic advantage. In fact, the strategic value of IT integration in the airline industry has been a concern for the past 20 years [e.g. 13]. IT can be a driver for developing or

sustaining a competitive advantage [14]. The role of IT in the airline industry has been examined in the various stages of flight operations [15], but not yet from a fully passenger-centric perspective. The purpose of this paper is to fill such a gap.

Airlines are currently scrambling to come up with new measures in order to cut their cost drastically. Current operational costs of airlines are too high given the current revenue stream, and the upward spiralling cost of fuel alone is a growing problem for all operators. While some operators like American Airlines have decided to cut costs using some common sense fuel saving measures such as taxing using a single engine, and using terminal based power while at the gate [16] other operator choose more questionable avenues. Recently Air Canada regional carrier Jazz has announced they were removing lifejackets from all of their airplanes in order to save on fuel used to carry this dead weight [17]. It is still unclear even to them how much fuel will be saved. The reality is that they most likely will save on the cost of maintaining this piece of equipment. However, cutting down in safety features of aircraft is certainly not a good way to ensure long-term stability and certainly makes for public relations headaches. The key to a sustainable airline industry thus lies in a combination of operational efficiency and customer satisfaction.

This paper aims at improving both the operational efficiency of current systems and improving the current airline passenger satisfaction with the service received. While it does not have the pretention to be a cure to the current ailing industry it proposes a new framework for dealing with service failures and improving the information flow between the client and the service provider. This paper is divided in two main parts. The first reviews pertinent literature and proposes a customer centric view to system design and service quality. The second part deals with specific airline systems for improving the current information flow, and puts forth a proactive failure recovery process to improve service quality. Lastly, it offers some concluding remarks on possible implementations across domains and future research possibilities.

2. A Customer-centric View

Recent research underlines the importance of understanding customers, if only for designing efficient marketing strategies [18]. Customer centricity is believed to generate substantial value [19]. Previous studies have suggested that airline service quality is one of the most critical factors that are likely to influence a traveller's airline selection [20]. Furthermore studies have shown that there is a correlation between service quality and customer loyalty [21]. Thus, airlines resort to frequent flyers programs [22], or to similar tools, in order to increase customer loyalty as well as to gather data on their customers' behaviours and preferences. Like other industries, airlines can develop two types of loyalty; a true long-term loyalty or a false loyalty. An example of false loyalty in the airline industry is a passenger choosing an airline due to a frequent flyer program. An airline choosing to merely satisfy customers, who have choices, is not enough to keep them loyal [23]. Therefore airlines must strive for total customer satisfaction if they want to achieve greater loyalty.

The behaviour of travellers has often been modelled as a two-step choice where airline choices are contingent on airport choice [see 24]. It is thus important for airlines to find ways to strategically differentiate themselves from competitors. Park *et al.* [25] have shown that the value of the service, passenger satisfaction and the image of an airline impact the passengers' decision process. The way complaints are dealt with also bears much importance [26]. Park [27] has also determined that passenger perceptions are contingent on usage (i.e. chosen airline, class, frequency) leading to the self fulfilling prophecy that the best airlines get the passengers that in turn have the tendency to choose the best airline. Customer satisfaction thus is a key driver of airline profitability because of its potentially positive effects on referrals and word of mouth. Airlines therefore need to pay careful attention 1) to influencing customers' expectations and related factors as well as 2) to the complexity of its offers in the marketplace.

2.1 Influencing Expectations

It may be beneficial to influence customer expectations of service prior to consumption [28]. The needs and perception of service depend on which category the passengers belong to, deBarros *et al.* [29] show that transfer passengers have very different needs than originating and terminating passengers. Customers' expectations may also vary depending on the portion of their journey they are in, i.e. airborne or not as their reaction to food quality demonstrates [e.g. 30]. Furthermore, cultural traits impact the perception of service quality [31]. While the pervasive halo effect is clearly present in airlines, according to Halstead [32]. In her comparison study of the halo effect in the airline industry to another service sector, it was found that a strong complaint correlation of 0.90 exists between airlines service attributes, which support the existence of the halo effect. This halo effect can also be explained by the low incremental transactional costs for passengers in further complaining [33]. Bowen *et al.* [34] also note that Southwest has the lowest customer complaint rate of all US based airlines with 0.33 per 100,000 passengers in 2002 compared to an industry rate of 1.22 per 100,000 passengers. One of the possible explanations for such a low rate is the low customer expectation when boarding a no-frills airline, another would be the consistently to which Southwest deliver their service and is hence in line with the customer expectation. Nonetheless, passengers' expectations of high service quality depend on four important and separate elements: responsiveness, reliability, convenience, and safety and security.

Responsiveness. While customer expectations may vary across the service-related processes, the typical passenger tend to place a premium on responsiveness by their carrier airline staff [35]. In a recent study on a Turkish airline, Pakdil and Aydin [36] found that the responsiveness of an airline influences the perception of service quality and that passengers' level of education also had a significant effect. This is also consistent with the results of the study conducted by Aksoy *et al.* [18]. They found that punctuality, which included factors such as: on-

time departure, arrival, and luggage delivery, to be a significant service attribute expected by both domestic and foreign airline passengers. However, over-generosity in service recovery efforts may yield adverse effects [37] as customer expectation for future recovery effort can spiral upwards.

Reliability. A study of passenger expectations in airline services from Gilbert & Wong [38] found that the second most important criteria for passengers was the reliability of the service; on time departure and arrival. They also concluded that airlines should focus on being prompt, responsive, and having a willingness to help while maintaining a courteous attitude should be a top priority of today airline companies.

Convenience. Internet-based reservation systems provide passengers with increased convenience and carry substantial payoffs for airlines [39]. More recently the new self-check in kiosk, and in some cases mobile access to numerous features such as checking-in via smart phone have added new levels of convenience appreciated mostly by frequent travellers.

Safety and security. Policy and systems interact and often cause extra security related [see 40] concerns and delays in passenger flows thus reducing the overall perceived quality and satisfaction from the travel experience. This matters very much for individual airlines as service quality may also serve as an indicator of safety quality [8].

2.2 Complexity

The airline industry provides increasingly complex services to customers because of the complexity of the current airline networks, of airports and the lack of integration and richness between the sources of information a passengers needs to use during their journey. The network architecture of the airline industry [41] implies added cognitive strain on *ad hoc* passengers

because of its complexity, of the varying potential information asymmetry between all agents delivering various portions of the service chain and the potential disruptions caused by factors beyond passenger control that range from weather constraints to mechanical breakdowns to gate changes to overselling tickets that result in unexpected modifications/cancellations in travel plans.

Furthermore, airports, especially mega-hubs, are increasingly vast as they provide an ever-increasing array of services. An information-rich passenger-centric environment is essential especially in the case of larger airports because of the sheer volume of travel (e.g. flights) and non-travel (e.g. food courts and availability of special services) related information a customer needs to manage. In mid-size to smaller airports, it could serve as a tool to stop airport leakage other than by using prices [42]. Reliance on IT for matching customers' expectations and for dealing with complexity has been growing in the industry.

3. IT, Passengers and Airlines

Many studies have already established that retaining and satisfying customers can be much less costly and more profitable than obtaining new customers [43]. Given the current harsh economic context of the airline industry, airlines should focus on retaining current client while gaining a competitive edge through extensive us of Information and Communication Technology (ICT) systems, not only in designing and fielding new systems and services, but also through active service redesign [44].

3.1 IT and Passengers

So far, the trend has been to increase the use of IT and automation by unloading various elements of the service process to customers (i.e. self check-in, etc.) but without looking into a tight integration of a wide array of services. Human-systems integration is often overlooked [45].

Better integration of the customer's needs and expectations into the airline workflow management may also yield substantial benefits [see 46]. E-service, according to Rust and Lemon [47], provides increased interactivity at higher levels of customisation and bear the potential to increase responsiveness significantly.

Websites have been a preferred service delivery tool for the airline industry. Shchiglik and Barnes [48: 23] point to four essential dimensions: site quality, information quality, interaction quality and airline specific quality. Also, customers are increasingly sophisticated in their use of IT for transacting with organizations: a majority of potential passengers have switched to online channels for airline ticketing [49] since for example, it sometimes reduces the time they spend waiting in line. Consequently, levels of online booking adoption vary according to customer airline preference (i.e. low frills vs conventional) [50]. This suggests they are ready to adopt and move toward an integrated information-rich environment.

3.2 IT and Airlines

Airlines have been focusing their IT efforts toward increasing their operational efficiency. An important area are IT systems for dealing with flight disruptions [51, 52] as these events bear substantial cost implications in the event of delays and cancellations [53, 54]. Disruptions directly at flight gates are also sources of added costs and delays for airlines [55] and of much frustration for passengers. Seemingly menial tasks are also becoming more IT-dependent, such as luggage management [see 56]. Continental for example has been focusing on applications like real-time business intelligence [57].

3.3 A Passenger Information System

The travel industry, including airline companies, already uses a wide range of ICT systems. The emergence of the internet in the mid-1990s as well as the development of intranets

and extranets has made airlines refocus their strategy on technology innovations to enhance their competitiveness. It is a great opportunity for airlines to save on distribution cost and facilitate the reengineering of their structure [58]. Hence it is important to recognize that a customer throughout the process of his journey, from the start of the booking, to his final arrival will need to interact with more than one medium of communication. Figure 1 is a representation of how these various mediums should be interfaced for a customer interaction.

Insert Figure 1 Here

It is important to note that the customer lies in the middle of an information loop, which should seem seamless to him, while providing various level of media richness. The central information system is the connecting point between customer centric system and the other side of operations support system. The information loop use a variety of communication channels in order to give the best delivery method as desired by the customer but also dictated by the context of the information. This then allows a combination of user malleability to his personal preferences, and intelligent system configuration that picks the most efficient information delivery method, given the information type and temporal context.

3.4 The Benefits of a Proactive Approach at DHL

Sometimes the best lessons can come from an unexpected industry; DHL a global transport integrator has been leading the way in its proactive customer relationship management (PCRM) approach [e.g. 59]. When a package is delayed damaged or lost DHL contacts the client immediately, and this before the client even expects his package. In the overnight air express business, timely deliveries are a very significant service quality attribute. A client that expects his letter to arrive before ten in the morning but due to delays would actually receive his letter in the afternoon would cause him serious problems. The very reason he chose this type of service was

the safe delivery of the package and the assurance it would be there at the stated time. This type of incident would place DHL in service failure, if no prompt recovery is launched it could have serious repercussions on future and repeating business. DHL chose to be more than prompt, they are proactive; they start the recovery before the customer perceives the service failure. As such when DHL knows they will not be able to make their timely commitment, they contact the client first thing in the morning to advise him of the situation. This does not make up for the client's problem but increase the perceived quality of the service by acknowledging the failure and providing personal attention to the client. Doing so also increases the likelihood of retaining the client. DHL has found that providing a proactive approach has diminished the number of confrontations. The traditional approach where a client called to report the missing parcel gave rise to more tense situations for customer service representatives. Now with the PCRM approach they spend less time calming the client and more time resolving the problem, which in turn improves their operation efficiency.

3.5 System Opportunities

Nowadays the advent of modern wireless communications represents the convergence of two key technology trends of the 1990s: portability and networking [60]. The recent GPRS (general packet research service) system is a great opportunity for airlines to have a PCRM strategy, as are faster and better upcoming protocols. The GPRS system can deliver data directly to handsets, which are, in essence, always connected. These newer handsets are more suitable for ad hoc m-commerce, such as instant messaging or alerts [60]. Timely information could be directly sent to customers and a shift in the onus could occur. No longer would passengers have to worry about retrieving crucial information, the airlines could guarantee delivery of such data, and let the customers focus on more value adding activities. As outlined previously, one of the main concerns of all travellers, which is considered a key service quality attribute, is punctuality. From the previous studies discussed, there is no ambiguity about this representing an important area for

airlines to compete in. The following two elements are to me a simple way for airlines to switch to a proactive approach, making better use of ICT for a small marginal cost. Figure 2 represent a conceptual framework in rethinking the failure recovery approach. It thus purports to change the sequence of typical failure recovery in order to ensure, a better cycle time, better service quality, and a proactive approach to customer service.

Insert Figure 2 Here

As we can see instead of having the customer detect the failure and instigate the failure recovery a system agent detects the failure and allow for a recovery to be launched. Once the recovery process is launched the customer is then notified of current steps taken and how the problem will be solved.

Since information lies at the centre of the business-organization-technology triangle [61], it allows for a better integration of these three dimensions. Lee *et al.* [62] suggest that technologies need to be customized and aligned in order to generate an appropriate knowledge environment while also taking into account the necessity of understanding the intricacies of the business process at play. A passenger information system could possess e-commerce modules for which adoption could be facilitated by offering lower prices than through conventional channels as in the case of traditional online e-commerce [63]. This system could constitute an ideal m-commerce platform as ticketing applications are under development [64]. These types of services and applications are increasingly expected and used by consumers as their age cohort is typically younger [65].

3.6 Potential Applications

Potential applications for such systems include servicing luggage delays and flight delays. As figure 3 illustrates, the need and information flow throughout the journey of a customer varies. The figure shows the typical need of customers in terms of updates and information. The two main concerns for most passengers are flights status and luggage status, which together form the whole of the service delivery.

Insert Figure 3 Here

Luggage delays. The technology has greatly evolved since the airlines started in the 1950s. Now all luggage are tagged with bar-coded labels, in some airports the movement of single pieces of luggage can be followed in real time. The key is to integrate all the information systems used to deliver the required data in a proactive manner. A handful of carriers increasingly try to proactively trace every single piece of luggage. When a warning would be triggered by the system that a piece of luggage did not follow through, a message could be sent to the destination terminal. There an attendant could prepare all necessary steps in recovering the service failure. Taking simple measures such as meeting the client at the gate, and proactively address the issue. This would sharply contrast with the current approach of having him wait at the luggage pick up area. Another alternative could be to have a message sent to the aircraft advising the flight crew of the issue. This would enable them to take action immediately to improve the customer's journey. They could do such things as offering him a free upgrade to first class, and take arrangements prior to the plane landing. This would certainly make a difference in the customer's perception of the service quality.

Flight delays. ICT systems have already improved the prompt accessibility of flight status to airlines customer. It is now possible for customers to log on to the airline's web site to

access latest information or use the conventional phone-in system, often offered through a toll free number. Some companies even go as far as providing average waiting time per airport at a given time. While all these services alleviated some of the frustration by preparing customers to brace for service failure it remains a passive system that every customer has to access. A shift towards a dynamic/proactive approach where the customer will be able to have confidence in the airline's service delivery timetable is proposed to provide the key information when required. Just a few years ago it would have been impossible to think that an airline would contact directly a customer to advise him of flight delays. Nowadays with the current level of technologies it is possible for airline companies to offer that level of personalized service to their customers. Instead of having the customer log in, or dial in, to verify just in case there would be delays, the clients could be directly advised through automated messages. Since airlines already have integrated information systems that are updated in real time, the leap towards sending customized messages to their customers would be small. Whether through e-mail, fax, SMS or automated telephone call, this timely information could be sent to customers affected by a given problem. A large percentage of the population already has access to SMS type messaging through their mobile phone, using this technology would be cost efficient and require very little change from current ICT systems.

4. Concluding Remarks

These kinds of arrangements would clearly distinguish an airline from its competitors and ensure a prompt recovery before the perceived failure. It would also send a strong message that the airline cares about the customer and that his time is valuable. While this system is applied to the airline passengers specifically, a proactive approach to service failure recovery could be beneficial to other domain within the service industry.

A question that remains for future research in this stream is why passenger airlines are lagging behind air cargo companies. They both operate in a very competitive market and need to fight fierce battle to maintain their current market share. Perhaps the reason cargo company are leading the way is that more revenue can be generated by carrying a cubic metre of letters than by carrying passengers. Has the time of air express parcels become more valuable than the time of passengers? Going for a proactive approach will never make up for getting it right the first time, but it will certainly provide a great service recovery and lighten the stress burden of passengers while giving a distinctive competitive advantage to the companies that will adopt a PCRM approach.

While airline market orientation is positively related to business performance [66], Gudmundsson [67] found that financial distress was less likely for airlines that emphasized brand image and productivity rather than classical market power. From the customer's perspective, a brand, or group of brands, may be strongly reinforced by radical uses of IT. Interorganizational information systems may contribute to competitive advantage of early and late adopters by leveraging technology and by constantly innovating to provide the customer with more value [68] and a higher level of service. From an airline manager's perspective, emerging technologies constitute a powerful answer to competitive pressures. Furthermore, the financial benefits of a proactive approach need to be evaluated. Like Automated Vehicle Location, that assist managers in preventing congestion and increasing the level of service in bus transportation networks [69], complex innovative algorithms could be implemented to assist passengers, airport and airline managers, in optimizing passenger throughput and experience and thus airline revenue.

It has been known for a while that IT does profoundly affect some industries dynamics [70]. Passenger information systems that provide an integrated information-rich environment may be one tool to assist in maintaining competitiveness of airlines or air travel as a whole, along with

the more classically used capacity-reduction [e.g. 71], to mitigate the effects of the cyclicality of the airline industry. However companies teaming together solely for a joint activity, event if IT related, may not have lasting relationships provided they do not delve into deeper commitments [72] or do not pay careful attention to their asymmetries [73].

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ANNEX – FIGURES

Figure 1: A Passenger-centered Information System

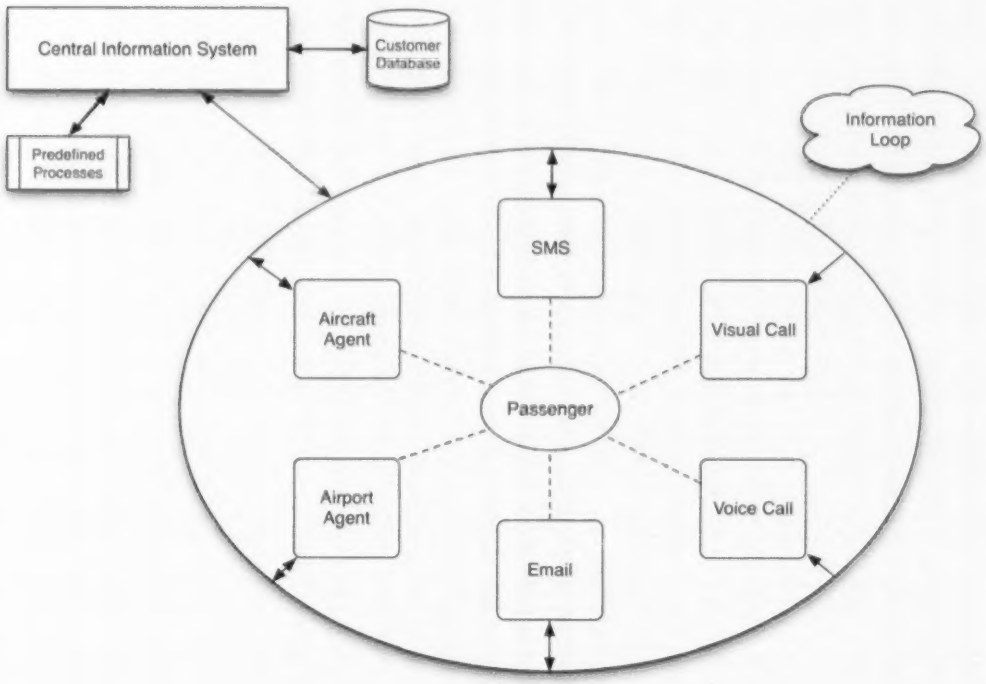

Figure 2 : A Proactive Approach in Service Failure Recovery

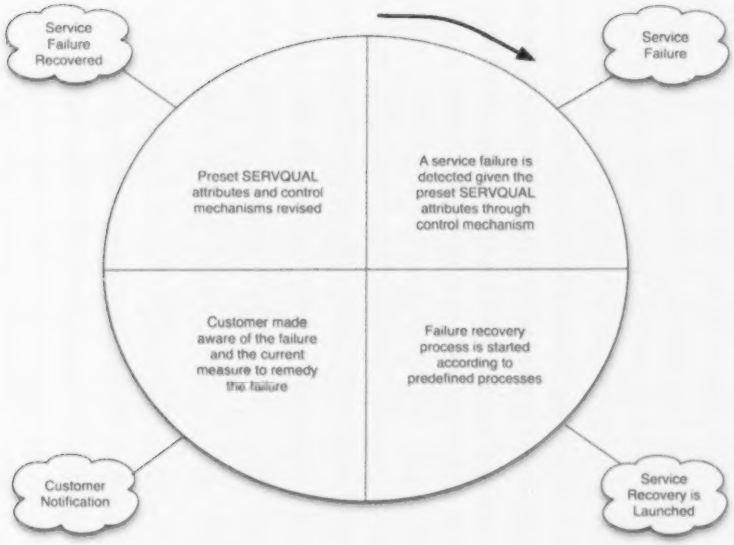
Service Failure Recovered
Service Failure
Preset SERVQUAL attributes and control mechanisms revised
A service failure is detected given the preset SERVQUAL attributes through control mechanism
Customer made aware of the failure and the current measure to remedy the failure
Failure recovery process is started according to predefined processes
Customer Notification
Service Recovery is Launched

Figure 3: Information Flows and the Traveller's Journey